Appendix L2

Draft Off-site Habitat Restoration Plan

Ocotillo Wind Energy Facility

Draft Off-site Habitat Restoration Plan

February 17, 2012

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Ocotillo Wind Energy Facility
Draft Off-site Habitat Restoration Plan

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EXECUTIVE SUMMARY

Carrizo Marsh (Marsh), located in Anza Borrego Desert State Park (ABDSP), historically has been an important resource to the region's wildlife, including migratory bird species and Peninsular bighorn sheep (PBS; *Ovis canadensis nelsoni*). The Marsh was overtaken by non-native tamarisk scrub following a flood in 1976. The flood and associated sedimentation disturbed the Marsh's native vegetation and hydrologic regime. These changes to the Marsh greatly diminished its value to the region's wildlife. Pattern Energy Group, through Ocotillo Express LLC, is proposing to restore the approximately 318-acre Marsh through the removal of tamarisk stands and other non-native species, which would meet and exceed the required compensatory mitigation requirements for the proposed Ocotillo Wind Energy Facility (OWEF) project's impacts to PBS Essential Habitat (as defined in the Recovery Plan [USFWS 2000]), jurisdictional habitat, and sensitive vegetation communities.

The primary goal and objective of this conceptual Habitat Restoration Plan (HRP) is to eliminate tamarisk scrub from the Marsh with the intent that this removal will result in a more natural hydraulic and hydrological regime within the Marsh, an improvement in the availability of surface water within the Marsh, greater habitat diversity, and higher quality habitat for wildlife species. Currently, the majority of the approximately 318-acre Marsh is dominated by dense stands of mature tamarisk (*Tamarix* spp.) trees that impede flow and offer limited wildlife value. When flood flows are impeded, they slow down and drop their sediment. Less impeded flows would not drop sediment and would increase sediment transport through the marsh. Increases in habitat diversity and habitat quality are expected to occur as a result of a gradual, natural succession and recruitment of native vegetation following tamarisk removal, which is expected to improve the habitat quality for PBS, migratory birds, and a variety of other wildlife species. An expansion of native wetland habitats, an increased amount of surface water, higher groundwater and a return to more natural sediment transport through the Marsh are expected following removal of the tamarisk and reestablishment of native habitats. The basis for these expectations is that the phreatophytic tamarisk uses more water than the mosaic of native habitats are expected to use, and the tamarisk thickets trap more sediments than a system vegetated by native species.

The restoration effort outlined in this HRP includes the initial removal of tamarisk through mechanical means and through fire, followed by 5 years of maintenance efforts to remove tamarisk resprouts and other non-native weed species. The removal of over 300 acres of dense stands of tamarisk trees will result in the restoration of the most regionally significant water bodies in the Anza Borrego Desert. Removal of tamarisk scrub from the Marsh coincides with Carrizo Creek watershed improvements by ABDSP. These improvements comprise the elimination of tamarisk scrub from Carrizo Creek and its associated watershed. ABDSP has already begun removing tamarisk scrub from the Carrizo Creek watershed above the Marsh (James Dice, pers. comm. August 23, 2011). The removal of tamarisk scrub from the Marsh is being done in cooperation with ABDSP.

I. INTRODUCTION

This off-site Habitat Restoration Plan (HRP) provides technical guidance for implementing, maintaining, and monitoring the wetland restoration performed as mitigation for impacts to jurisdictional areas, sensitive animal species, and sensitive vegetation communities resulting from construction of the proposed OWEF, as required by the Bureau of Land Management (BLM), County of Imperial, and resource agencies (U.S. Fish & Wildlife Service [FWS], U.S. Army Corps of Engineers [Corps], California Department of the Fish & Game [CDFG], and Regional Water Quality Control Board [RWQCB]). Restoration addressed in this HRP provides mitigation for resources impacted during the construction of the proposed OWEF. The goal of this HRP is to restore off-site wetland habitat to a condition in which it equals or exceeds the functions and services of the jurisdictional areas and sensitive species habitats affected by project activities within the OWEF.

Removal of tamarisk scrub at the Marsh is the subject of this HRP. A prescribed burn is proposed to remove dead and live tamarisk biomass that has accumulated at the Marsh. The prescribed burn will be done under the direction and by two state agencies: California State Parks (State Parks) and California Department of Forestry and Fire Protection (Cal Fire). Any and all details in this plan regarding the prescribed burn (e.g., timing, necessary fuel breaks, etc.) are preliminary and subject to review and modification by State Parks and Cal Fire. This plan is primarily concerned with the maintenance and monitoring of tamarisk control in the Marsh following any prescribed burns, but also includes control of other non-native weed species during the course of the proposed 5-year maintenance and monitoring period.

A. PROJECT BACKGROUND

1. Project Location

The OWEF is located near the town of Ocotillo, on the western edge of Imperial County, California (Figure 1). It is almost entirely on BLM land and within four U.S. Geological Survey 7.5-minute quadrangle maps: Carrizo Mountain, Coyote Wells, In-Ko-Pah Gorge, and Painted Gorge (Figure 2). The northern portion of the study area is situated north of Interstate 8 (I-8), from the Imperial/San Diego County border at its western edge to approximately 1.5 miles northeast of the town of Ocotillo on its eastern edge. The northern area (Site 1) includes several distinct features, including a portion of the I-8 Island, which is undeveloped rocky and hilly terrain between the eastbound and westbound lanes of I-8, Sugarloaf Mountain, and a portion of the San Diego and Arizona Eastern railroad tracks (Figure 2). County Route (CR) S2 bisects the northern project area, and I-8 passes through the southern edge of the northern project area. The southern area (Site 2) is smaller than the northern area and the majority is south of State Route (SR) 98.

2. Project Description

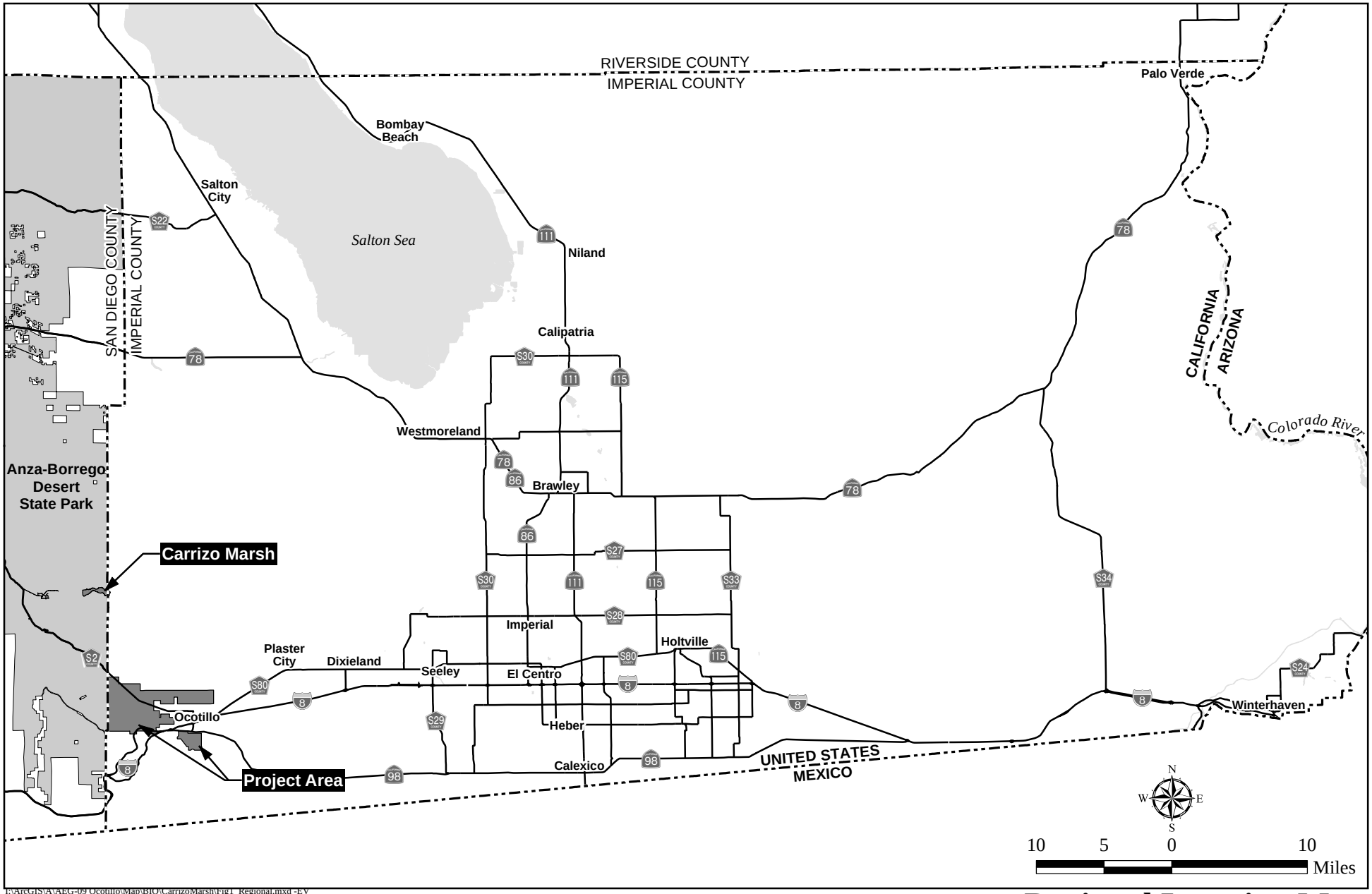
The OWEF consists of construction, operations and maintenance (O&M), and decommissioning of up to a 356.5-megawatt wind energy facility within an approximately 12,484-acre project area. Facilities for the OWEF would consist of up to 155 wind turbine generators (WTGs), above-ground and below-ground electrical transmission/collection systems for collecting the power generated by each WTG, an electrical substation, interconnection switchyard, access roads, three meteorological towers, a biological monitoring observation tower, and an O&M building. The expected OWEF operation life is 30 years, consistent with the BLM right of way grant.

B. SUMMARY OF IMPACTS

1. Jurisdictional Habitat Impacts

Pursuant to Section 404 of the federal Clean Water Act, the Corps regulates the discharge of fill material into Waters of the U.S. and evaluates the impacts of the placement of proposed fill into such waters. Under Section 401 of the federal Clean Water Act, the RWQCB also has authority over Corps jurisdictional areas. To ensure no-net-loss of jurisdictional areas, as well as associated functions and services, Corps requires compensatory mitigation for jurisdictional impacts. Jurisdictional impacts and mitigation can be assessed by mapping vegetation and delineating Corps wetlands as specified in current manuals (Environmental Laboratory 1987 and Corps 2008). To fully evaluate the functions associated with Marsh restoration, however, a function-based assessment tool such as the California Rapid Assessment Method (CRAM; Collins *et al.* 2008) should be employed. CDFG regulates impacts to wetland habitats pursuant to Section 1602 of California Fish and Game Code. Permit applications were submitted in May 2011 to Corps under Section 404 of the federal Clean Water Act, to the CDFG under Section 1600 of the California Fish and Game Code, and to the RWQCB under Section 401 of the federal Clean Water Act for impacts to jurisdictional areas.

The OWEF project would result in temporary and permanent impacts to Corps jurisdictional areas (i.e., non wetland Waters of the U.S.) that would total 5.57 acres (Table 1). Corps jurisdictional drainages occur throughout the OWEF. The majority of the impacts would be two 1-foot to 7-foot-wide drainages that are typically only a few inches deep. These smaller drainages carry short-term surface flows during seasonal rain events. Access roads and the underground collection system would impact larger drainages, including drainages up to 80-feet wide in the northeast portion of Site 1. Given the anticipated impacts to Corps jurisdictional areas the Applicant is required to obtain the applicable permits from the Corps and RWQCB. It is anticipated that the project would need to obtain an Individual Permit from the Corps in accordance with Section 404 of the Clean Water Act and a Water Quality Certification from the RWQCB in accordance with Section 401 of the Clean Water Act.



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Regional Location Map

OCOTILLO WIND ENERGY FACILITY

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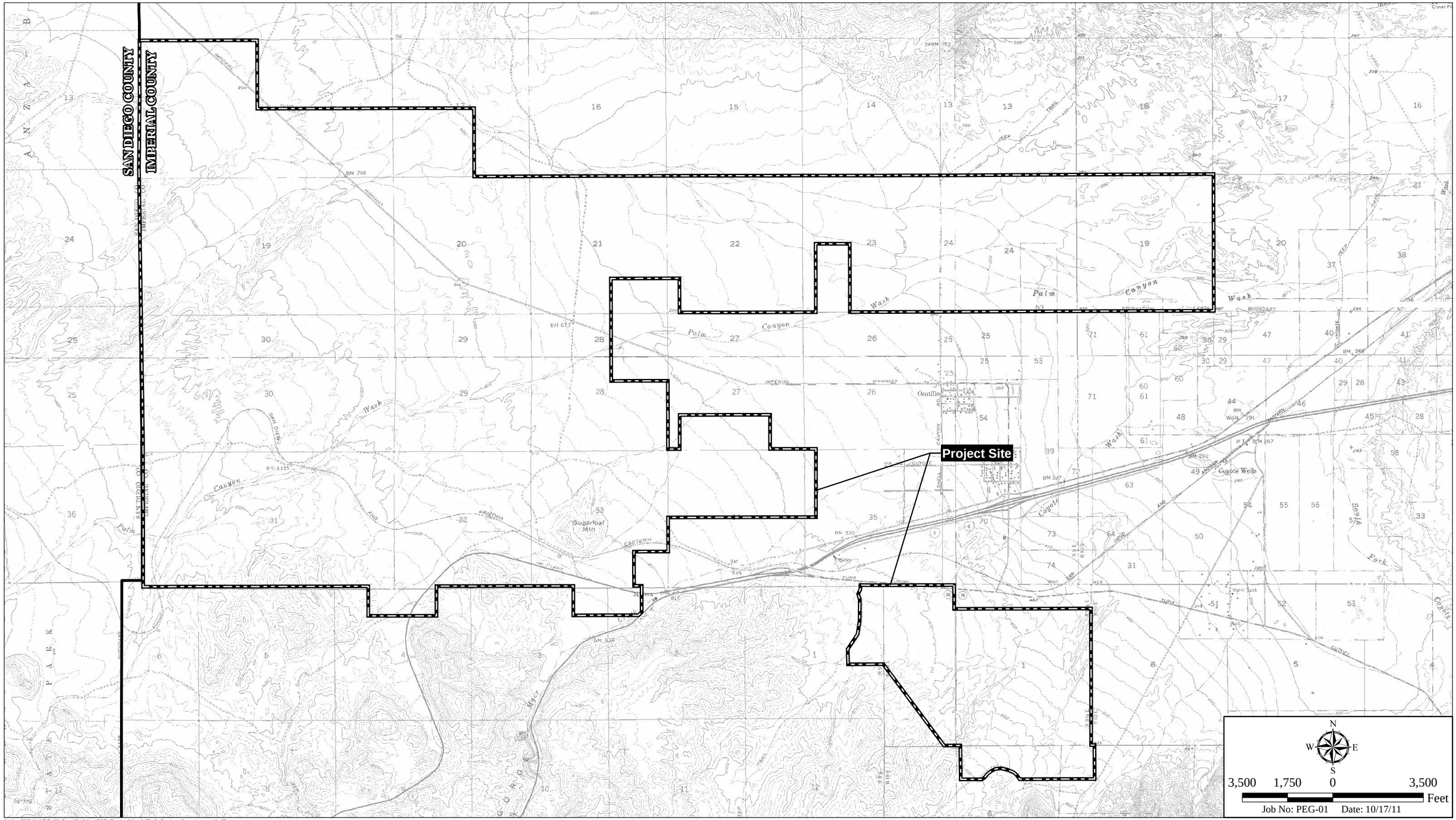
Figure 1



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Job No: PEG-01 Date: 10/17/11

Project Location Map

OCOTILLO WIND ENERGY FACILITY

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Figure 2

The OWEF project would result in temporary and permanent impacts to CDFG-jurisdictional streambed and to the following CDFG vegetation types: allscale scrub, cheesebush scrub, creosote bush-allscale scrub, creosote bush-fourwing saltbush scrub, fourwing saltbush scrub, mesquite thicket, and smoke tree woodland (Table 1). The Proposed Action would result in temporary and permanent impacts to a total of 23.20 acres of CDFG-jurisdictional areas. As noted above for Corps-jurisdictional areas, the majority of the impacts would be to 1-foot to 7-foot-wide drainages that are typically only a few inches deep. Impacts to CDFG-jurisdictional areas would occur as a result from access road and underground collection system construction in the northern and northeastern portions of Site 1. Given the anticipated impacts to CDFG jurisdictional areas the Applicant is also required to obtain a Streambed Alteration Agreement from the CDFG in accordance with Section 1602 of the California Fish and Game code.

Table 1
IMPACTS TO JURISDICTIONAL AREAS

Habitat	**Corps**		**CDFG**	
	Temporary	**Permanent**	**Temporary**	**Permanent**
Jurisdictional Habitats				
Allscale scrub	0	0	1.39	0.17
Cheesebush scrub	0	0	10.46	4.68
Creosote bush-allscale scrub	0	0	0.06	0
Creosote bush-fourwing saltbush scrub	0	0	0.04	0.02
Desert lavender scrub	0	0	0	0
Fourwing saltbush scrub	0	0	0.45	0.30
Mesquite thicket	0	0	<0.01	0
Smoke tree woodland	0	0	0.86	0.30
Subtotal	0	0	13.26	5.47
Non-Wetlands				
Drainage/Streambed	4.22	1.35	3.40	1.07
Subtotal	**4.22**	**1.35**	**3.40**	**10.7**
TOTAL	**5.57**	**23.20**	**16.66**	**6.54**

Impacts to jurisdictional areas have been minimized as part of project design. Federal jurisdictional areas that will be impacted by the OWEF consist of non-wetland Waters of the U.S. State (CDFG) jurisdictional areas within the OWEF consist of unvegetated streambed and CDFG-jurisdictional vegetation. Mitigation for all temporary on-site jurisdictional impacts will be addressed through a separate on-site mitigation plan (currently *in prep*).

2. Peninsular Bighorn Sheep Habitat Impacts

A total of 3,691.9 acres of USFWS Essential Habitat for PBS (), occurs within the Project boundary. The OWEF project would directly impact 172.3 acres of USFWS Essential Habitat, including permanent impacts to 43.9 acres and temporary impacts to 128.4 acres. Permanent impacts within Essential Habitat include 12.9 miles of access roads and collection routes (29.5 acres), 36 WTG foundations and crane pads (7.7 acres), a portion of the substation and switchyard (5.9 acres), and 2 meteorological towers (0.8 acres). Temporary impacts include temporarily disturbed portions of the project including access roads and collection routes (61.6 acres), one staging area (10.0 acres; previously referred to as railroad unloading area), and 36 WTGs and crane pads ranging in size from 0.5 – 2.5 acres (56.8 acres). The permanent impacts would permanently remove vegetation within potential foraging areas; temporary impacts would temporarily remove vegetation within potential foraging areas and may result in short-term avoidance of suitable habitat when construction is occurring. All temporary disturbance areas on site will be revegetated in accordance with an on-site Habitat Restoration and Revegetation Plan (HRRP; *in prep*) and will be maintained and monitored for at least a 5-year period following the completion of construction.

Impacts to Essential Habitat have also been minimized as part of project design. The initial site plan was revised to remove 14 wind turbines in the southwest portion of the site and the proposed project right-of-way was also revised to exclude this area. A formal Section 7 consultation is being conducted between the BLM and USFWS for the proposed project's impacts to PBS and for impacts to least Bell's vireo (LBV; *Vireo bellii pusillus*) with the proposed mitigation described herein.

3. Sensitive Vegetation Community Impacts

Sixteen vegetation communities, three natural land cover types (badland/mudhills, rock/large boulder outcrop, streambed) and three altered land cover types occur within the proposed OWEF site. Eight of the 22 vegetation communities are considered sensitive vegetation communities according to the CDFG (2010), including big galleta grass shrub-steppe, brittle bush scrub, desert agave scrub, desert lavender scrub, mesquite thicket, smoke tree woodland, teddy bear cholla scrub, and white bursage scrub (Table 2). The OWEF project would result in direct impacts to 7.1 acres of brittle bush scrub, 7.3 acres of desert agave scrub, less than 0.1 acre of mesquite thicket, 8.8 acres of smoke tree woodland, 53.0 acres of teddy bear cholla scrub, and 4.2 acres of white bursage scrub. The project footprint would permanently remove vegetation communities, and the temporary disturbance areas on site will be revegetated in accordance with an on-site Habitat Restoration and Revegetation Plan (HRRP; *in prep*) and will be maintained and monitored for at least a 5-year period following the completion of construction.

Table 2 IMPACTS TO SENSITIVE VEGETATION COMMUNITIES				
Sensitive Vegetation Community/Habitat[2]	**Acreage**			
	Existing	**Impacts**		**Avoided**
		Temporary	**Permanent**	
Big Galleta Grass Shrub-steppe	1.9	0	0	1.9
Brittle Bush Scrub	92.9	5.3	1.8	85.8
Desert Agave Scrub	248.5	5.1	2.2	241.2
Desert Lavender Scrub	3.9	0	0	3.9
Mesquite Thicket	0.8	<0.1	0	0.8
Smoke Tree Woodland	380.9	7.3	1.5	372.1
Teddy Bear Cholla Scrub	663.0	33.0	20.0	610.0
White Bursage Scrub	176.2	3.4	0.8	172.0
TOTAL	**1,568.1**	**54.1**	**26.3**	**1,487.7**

C. MITIGATION REQUIREMENTS

A Draft Plan Amendment and Draft Environmental Impact Report/Draft Environmental Impact Statement (Draft EIR/EIS) has been prepared for the OWEF (BLM 2011). The Draft EIR/EIS includes several mitigation measures that require compensatory mitigation to offset the projects impacts to jurisdictional habitats, PBS Essential Habitat, and sensitive vegetation communities, which are listed below:

> **Veg-3** The Applicant shall prepare and implement a Jurisdictional Mitigation Plan to describe the mitigation for impacts to jurisdictional areas within the proposed OWEF site. The Jurisdictional Mitigation Plan shall be submitted to the ACOE, Regional Water Quality Control Board (RWQCB), and CDFG for review and approval and shall describe the location and size of the mitigation proposed, description of the habitat creation/restoration effort, success criteria, and maintenance and monitoring specifications.
>
> **Wild-1r** The Proposed Action's permanent impacts to 43.9 acres of USFWS Essential Habitat would be compensated at a 1:1 ratio by purchasing or restoring Essential Habitat from private landowners, which shall be made permanently available for PBS. "Available" is defined as habitat located in or immediately adjacent to the Essential Habitat line, as delineated in the Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (USFWS 2000).
>
> **Wild-1s** Prior to construction, a Bighorn Sheep Mitigation and Monitoring Plan shall be submitted to the BLM, USFWS, and CDFG for review and approval. The monitoring plan shall describe the monitoring and reporting procedures and the construction limitations to be implemented if sheep are observed in the proposed OWEF site.

Veg-2a Permanent impacts to sensitive vegetation communities shall be compensated through a combination of compensation and restoration at a minimum 1:1 ratio or as required by the permitting agencies. Habitat compensation shall be accomplished through agency-approved land preservation or mitigation fee payment for the purpose of habitat compensation of lands supporting comparable habitats to those lands impacted by the proposed project. Restoration may be appropriate as mitigation for permanent impacts provided that restoration is demonstrated to be feasible and the restoration effort is implemented pursuant to a Habitat Restoration/Revegetation Plan (Mitigation Measure Veg-2b).

This wetland restoration plan is being provided to meet the requirements of the mitigation measures listed above. This Draft HRP is being provided in place of the Jurisdictional Mitigation Plan required by Mitigation Measure Veg-3. A Bighorn Sheep Mitigation and Monitoring Plan (Mitigation Measure Wild-1s) is currently being prepared and will summarize the mitigation that is described in this Draft HRP. As noted in Table 3 and in more detail in the following sections, a total of 323.62 acres of off-site compensatory mitigation is required to offset the proposed OWEF's impacts to jurisdictional habitat, USFWS Essential Habitat, and sensitive vegetation communities. Implementation of the restoration of 318 acres of tamarisk removal and 5 years of maintenance and monitoring of the Marsh would offset the compensatory mitigation requirements for OWEF project.

Table 3
IMPACTS AND COMPENSATORY MITIGATION REQUIREMENTS FOR SENSITIVE BIOLOGICAL RESOURCES IN THE OWEF

Type of Impact	Impact Acreage	Proposed[§] Mitigation Ratio	On-Site Mitigation	Off-site Mitigation Acreage
Jurisdictional Habitat (includes Corps & CDFG)	4.56 permanent	6:1 (off site)	0	27.36
	19.28 temporary	3:1 (1:1 on site & 2:1 off site)	19.28 (revegetation)	38.56
Bighorn Sheep Essential Habitat	43.1 permanent	2:1 (off site)	0	86.2
	124.1 temporary	2:1 (on site)	124.1 (revegetation)	124.1
Sensitive Vegetation Communities	23.7 permanent	2:1 (off site)	0	47.4
	58.0 temporary	1:1 (on site)	58.0 (revegetation)	0
			TOTAL (off-site)	**323.62***

[§]These proposed ratios are subject to confirmation by the Corps following their completion of their mitigation ratio checklist.
*The off-site compensatory mitigation requirements for the project will be completely fulfilled through the restoration of the entire 318-acre Carrizo Marsh.

1. Jurisdictional Areas

An off-site mitigation ratio of 6:1 is proposed to offset permanent impacts to jurisdictional areas. Based on this ratio, impacts to jurisdictional areas, including both Corps jurisdictional areas and CDFG jurisdictional areas, shall require 27.36 acres of off-site mitigation. For temporary impacts to Corps and CDFG jurisdictional areas an off-site mitigation ratio of 2:1 (totaling 38.56 acres) and an on-site mitigation ratio of 1:1 are proposed. The on-site mitigation would occur in the form of revegetation of temporary disturbance areas. Therefore the resulting off-site mitigation acreage for jurisdictional areas impacts is 65.92 acres (27.36 acres for permanent impacts and 38.56 acres for temporary impacts).

2. Peninsular Bighorn Sheep Essential Habitat

An off-site mitigation ratio of 2:1 is proposed to offset permanent impacts to Essential Habitat for PBS. Based on this ratio, permanent impacts to Essential Habitat shall require 86.2 acres of off-site mitigation. An on-site mitigation ratio of 2:1 is proposed to offset temporary impacts to Essential Habitat. The on-site mitigation would occur in the form of revegetation of temporary disturbance areas totaling 124.1 acre (on-site revegetation would occur in accordance with the HRRP, *in prep*) and the off-site mitigation requirement totals 124.1 acres. Therefore, the resulting off-site mitigation acreage for USFWS Essential Habitat impacts is 210.3 acres. Restoration of the Marsh is considered acceptable mitigation for Essential Habitat impacts because the Marsh is delineated as Essential Habitat for PBS and restoration of the Marsh will replace on-site habitat currently, which is not currently used by PBS, with high quality habitat and access to surface water for PBS and a variety of other wildlife species.

3. Sensitive Vegetation Communities

An off-site mitigation ratio of 2:1 is proposed to offset permanent impacts to sensitive vegetation communities. Based on this ratio, permanent impacts to 23.7 acres of sensitive vegetation communities shall require 47.4 acres of off-site mitigation. An on-site mitigation ratio of 1:1 is proposed to offset temporary impacts to sensitive vegetation communities. The on-site mitigation would occur in the form of revegetation of temporary disturbance areas totaling 58.0 acre (on-site revegetation would occur in accordance with the HRRP, *in prep*). Therefore, the resulting off-site mitigation acreage for sensitive vegetation community impacts is 47.4 acres. Because of the regional ecological significance of the Marsh, its restoration will increase habitat values for the region; for this reason, it is considered acceptable out-of-kind mitigation for all sensitive vegetation impacts.

D. AGENCY COORDINATION

Several meetings have been held with agency personnel regarding the proposed mitigation at Carrizo Marsh.

- August 23, 2011 – initial meeting at Anza Borrego Desert State Park Headquarters in Borrego Springs to discuss the approach to the mitigation. Meeting attendees included Jim Dice, Gail Sevrens, and Eric Hollenbeck (State Parks); Shelby Howard, Barry Jones,

and Justin Fischbeck (HELIX Environmental Planning, Inc. [HELIX]); and Glen Hodges (Pattern Energy Group) in person as well as a number of people by phone, including Meris Bantilan-Smith (Corps), Nisa Marks (USFWS), Kim Marsden (BLM), Sally Trnka (HELIX), and Natalie McCue and James Dermody (Pattern).

- September 14, 2011 – site visit to Carrizo Marsh to discuss mitigation approach. Attendees included Shelby Howard, Barry Jones, Justin Fischbeck, and Zach Goedker (HELIX) and Matt McDonald (State Parks).
- September 16, 2011 – conference call to discuss the summary of impacts and proposed mitigation approach. Attendees included Meris Bantilan-Smith (Corps); Magdalena Rodriguez (CDFG); Natalie McCue (Pattern); Shelby Howard and Barry Jones (HELIX); Amy Fesnock, Daniel Steward, and Andrew Trouette (BLM).
- October 21, 2011 – site visit to Carrizo Marsh to discuss mitigation approach. Attendees included Shelby Howard, Barry Jones, Justin Fischbeck, and Larry Sward (HELIX); Meris Bantilan-Smith (Corps); Magdalena Rodriguez (CDFG); Nisa Marks (USFWS); Natalie McCue (Pattern); Andrew Trouette and Sharon Tyson (BLM); and Matt McDonald, Gail Sevrens, and Scot Martin (State Parks).

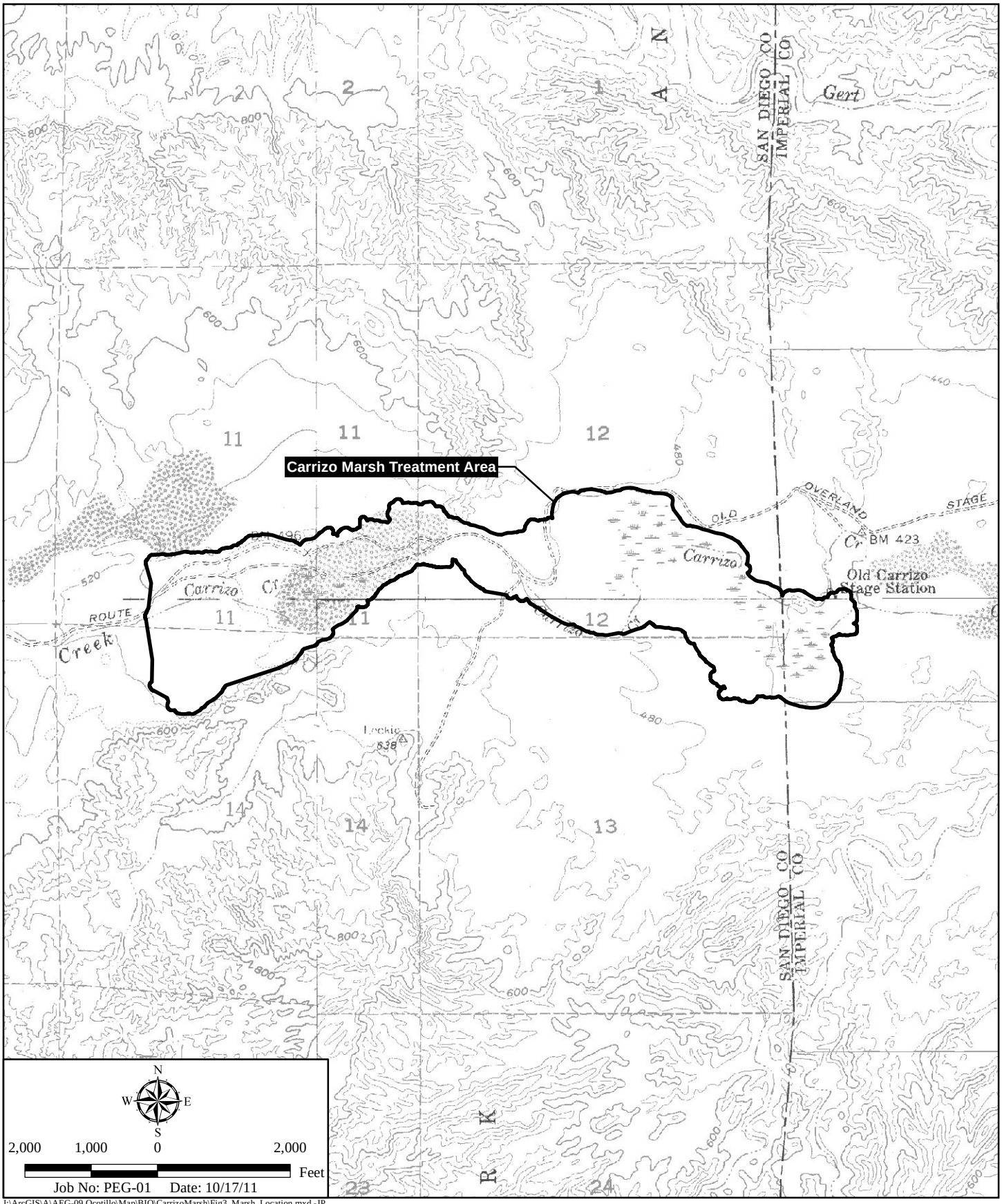
The Corps/CDFG, USFWS, and BLM have each indicated that conducting tamarisk removal in Carrizo Marsh is an acceptable form of mitigation to offset proposed project impacts to jurisdictional habitat, PBS Essential Habitat, and sensitive vegetation communities, respectively.

II. RESTORATION PROJECT

Off-site mitigation for impacts to Waters of the US and PBS Essential Habitat is proposed to occur at the Marsh. The Marsh is an extensive wetland area that was overtaken by non-native tamarisk species following a flood in 1976. The flood caused major sedimentation and disturbance to the Marsh's native vegetation and hydrologic regime. The proposed mitigation involves removal of tamarisk to allow the natural hydrology and successional processes of the native vegetation return to the Marsh. This section describes the location and current condition of the Marsh, sensitive species potentially occurring in the Marsh, and the suitability of the Marsh as a mitigation site.

A. LOCATION

The Marsh occupies approximately 318 acres where Carrizo Creek bisects the Carrizo Badlands, in the southeastern portion of Anza-Borrego Desert State Park. The Marsh is on the opposite side of the Coyote Mountains from the OWEF (Figure 3) and is situated on Geological Survey 7.5-minute quadrangle maps includes the northwest corner of the Carrizo Mountain, and adjacent areas on Carrizo Mountain NE, Sweeney Pass, and Arroyo Trapiado. It is mostly west of the San Diego – Imperial County line, with a small portion extending east into Imperial County and the Carrizo Impact Area, a former military bombing range. The Marsh lies approximately 5 miles east of Highway S2 at the end of a four-wheel drive road (Sweeney Road) that follows the bed of Carrizo Creek and provides access to the historic ruins of the Carrizo Stage Station.



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Marsh Location Map

OCOTILLO WIND ENERGY FACILITY

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Figure 3

B. ENVIRONMENTAL SETTING

The Marsh is an extensive wetland area surrounded by expanses of arid desert badlands and hills. Although Carrizo Creek and its major tributaries, Vallecito Creek and Bow Willow Creek, have intermittent surface flows, the Marsh is a perennial source of surface water. Carrizo Creek extends approximately 30 miles west and south to headwaters in the Jacumba Mountains south of Interstate 8, near the U.S.-Mexico border. Bow Willow Creek flows east from the Tierra Blanca Mountains, and Vallecito Creek drains the southern slopes of the Pinyon Mountains to the north. Both tributaries join Carrizo Creek less than a mile upstream of the Marsh. The Marsh contains several wetland vegetation communities, and is surrounded by patches of various upland and desert wash scrub communities.

Topography within the Marsh is flat, sloping gently to the east. Elevations range from 520 feet above mean sea level in the west to 435 feet above mean sea level in the east. No US government soils data exist for the area (Bowman 1973).

The historic stagecoach station ruins are a popular tourist destination, causing frequent vehicle traffic on Sweeney Road. This has resulted in Carrizo Creek becoming channelized in portions of the Marsh.

C. EXISTING FUNCTIONS AND SERVICES

This section provides a brief overview of the functions and services currently provided by the proposed mitigation area. This description is based on study of aerial photographs and site maps, online databases, site visits, and discussions with State Park personnel.

1. Vegetation

HELIX Environmental Planning, Inc. (HELIX) senior scientist Larry Sward conducted a site visit on October 11, 2011 to map vegetation in the Carrizo Marsh. Vegetation community descriptions in this section, including response to fire, are according to Sawyer *et al.* (2009); taxonomic nomenclature follows Hickman, ed. (1993).

The proposed mitigation area currently comprises four wetland vegetation communities and three upland or wash communities. The Marsh is overwhelmingly dominated by tamarisk thicket, with small patches of arrow weed thicket, iodine bush scrub, and American bulrush Marsh. Upland and desert wash scrub communities exist in the higher areas and along the perimeter, and include mesquite bosque, alkali goldenbush scrub, and black-stem rabbitbrush scrub.

Tamarisk Thicket

Tamarisk thickets occur along watercourses throughout the southwestern United States. The canopy is dominated by tamarisk, with little herbaceous understory. This community covers at least 80 percent of the Marsh. Tamarisk species are deep-rooted and re-sprout vigorously after

fire. Tamarisk, or salt cedar, (*Tamarix ramosissima*) comprises over 99 percent of the tamarisk in the Marsh. Athel (*T. aphylla*) also occurs within the Marsh.

Arrow Weed Thicket

Arrow weed thickets occur along intermittent streams and seasonally flooded areas, in saline or alkaline soil. They are dominated by arrow weed (*Pluchea sericea*) in the shrub layer and include iodine bush and saltbush. This community is uncommon in the Marsh, occurring along the edges of open areas. Arrow weed plants resprout after fire, but this species' fire ecology is not well known.

Iodine Bush Scrub

Iodine bush scrub occurs near the former Carrizo Stage Station. It is dominated by iodine bush (*Allenrolfea occidentalis*). This is another community of intermittently wet places; however, it favors heavy, very saline soils. It is found around dry lake margins, in playas, and on hummocks above current seeps and drainages. The herbaceous layer may include saltgrass (*Distichlis spicata*). Plants sprout after fire, but fire is likely not a common natural disturbance.

American Bulrush Marsh

This community occurs along streams and in fresh- and brackish-water marshes, in poorly aerated soils. The dominant species are American bulrush (*Schoenoplectus americanus*) and cattails (*Typha* spp.), along with other rushes (*Schoenoplectus* spp.) and rushes (*Juncus* spp.). In the marsh, this community is rare, occurring in moist patches where the road is deeply entrenched. These species re-sprout readily after surface fires.

Mesquite Bosque

Mesquite bosque is the native tree community in the Marsh. This community is dominated by mesquite trees in the canopy and the shrub layer includes iodine bush, western ragweed (*Ambrosia dumosa*), and several species of saltbush (*Atriplex* spp.). Both honey mesquite (*Prosopis glandulosa*) and screwbean mesquite (*P. pubescens*) are present in the Marsh, although honey mesquite is more abundant and both support desert mistletoe (*Phoradendron californicum*). Mesquite can re-sprout after low-intensity fire, but high-intensity fire often results in high mortality.

Alkali Goldenbush Scrub[1]

Alkali goldenbush scrub is an upland community of alluvial fans and old lake beds, above current drainages. It is dominated by alkali goldenbush (*Isocoma acradenia*) and contains other desert shrubs including (*Larrea tridentata*), and white bursage (*Ambrosia dumosa*). In Carrizo Marsh, this community occurs in patches at elevation slightly above the marshland, and around

[1] This habitat type is not listed in the Manual of California Vegetation (MCV: Sawyer, *et. al.* 2009) and is included here based on the dominance of *Isocoma acradenia* and lack of any suitable vegetation types in the MCV.

the perimeter of the Marsh. It is represented mainly by alkali goldenbush and creosote bush. These species can re-sprout after fire.

Black-stem Rabbitbrush Scrub

Black-stem rabbitbrush scrub is dominated by its namesake (*Chrysothamnus paniculatus*) and occurs in intermittently flooded arroyos and washes with sandy, well-drained soils. It includes a variety of desert shrubs and emergent catclaw acacia (*Acacia greggii*) trees. It is uncommon in the Marsh. Black-stem rabbitbrush is likely killed by moderate to severe fires.

Sensitive Plant Species

Only one sensitive plant species has been reported from the Carrizo Marsh area by California Natural Diversity Database (CNDDB): Harwood's milk vetch (*Astragalus insularis* var. *harwoodii*). This species is not listed by state or federal agencies, and its sensitivity ranking by the California Native Plant Society is 2.2 (rare in California but more common elsewhere; 80 percent of California populations are considered threatened). This is an annual that grows in sandy or gravelly desert washes and typically blooms between January and May. It potentially occurs at the Marsh. The effects of fire on this species are unknown.

2. Hydrology

The hydrology of the Marsh was severely altered by the flood in 1976, which deposited several feet of sediment in the Marsh. It has further been altered by tamarisk invasion and vehicle traffic on Sweeney Road. Tamarisk trees have trapped sediment and stabilized the stream banks, while Sweeney Road has become deeply entrenched in the heavy, organic soil of the Marsh. This has caused channelization of Carrizo Creek in the upper (western) half of the Marsh. Sweeney Road leaves the Marsh approximately halfway along its length, below that point the stream returns to a braided system. Surface water is present in the Marsh year-round as sluggish pool at the eastern end of the Marsh, and in isolated places along the road. The site floods during rain events, although tamarisk invasion has also altered the natural disturbance regime by trapping sediment. The removal of the tamarisk is expected to allow for the return of normal sediment transport through the area.

3. Wildlife

According to State Parks staff, PBS were regularly seen using Carrizo Marsh, but have not been seen using the Marsh since the infestation of tamarisk that followed the flooding in 1976. The Marsh is presumably frequented by numerous migratory and resident birds, as it is the only perennial wetland habitat in the area.

Other sensitive animal species reported by CNDDB from the vicinity of the Marsh are barefoot banded gecko (*Coleonyx switaki*), Colorado Valley woodrat (*Neotoma venusta*), least Bell's vireo, prairie falcon (*Falco mexicanus*), and red-diamond rattlesnake (*Crotalus ruber*). Barefoot banded gecko is state listed and LBV is federal and state listed. The remaining species are considered species of special concern. The barefoot banded gecko is restricted to boulder and

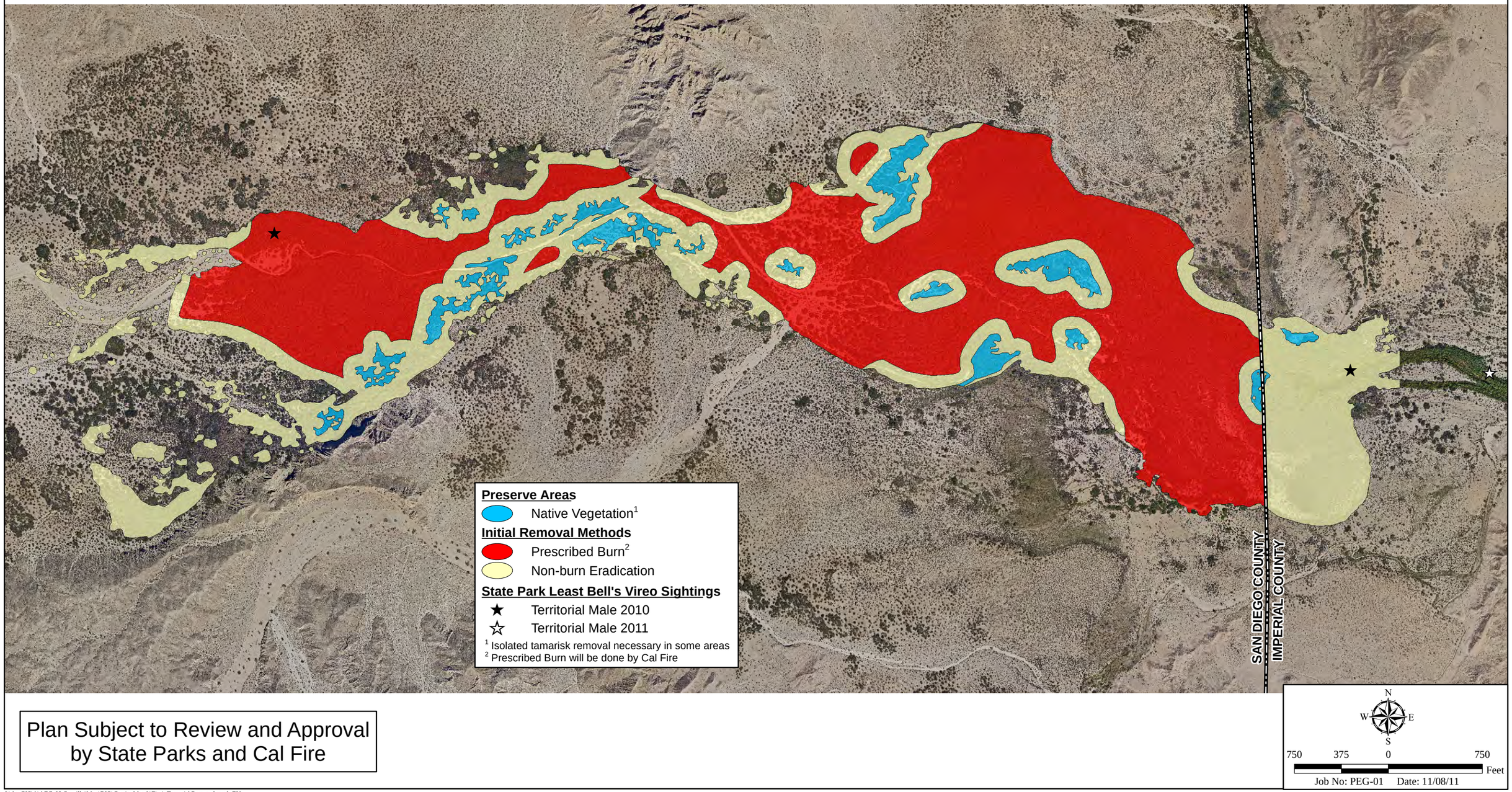
rocky habitat with interstitial spaces for daytime protection, which do not occur within or adjacent to the Marsh. The red diamond rattlesnake inhabits rocky slopes and are unlikely to be present in the Marsh itself. Colorado Valley woodrats prefer open, rocky, riparian areas to closed canopies, and in California usually nest at the base of mesquite trees. The replacement of mesquite bosque by tamarisk thicket has likely reduced the attractiveness of the Marsh for this species. Prairie falcons nest on cliffs and escarpments and so do not rely on the Marsh for nesting, but many of its known prey species (e.g., small mammals and bird species) were likely more abundant at the Marsh when it consisted of native species.

Least Bell's vireo is a migratory songbird that is known to occur in the Marsh during its breeding season (March 15 through September 15). State Parks provided HELIX with the GPS locations of territorial male LBVs documented in the Marsh as part of survey efforts in 2010 and 2011. Two territorial males were noted in 2010 (one at the western end and one at the eastern end of the Marsh; Figure 4). One territorial male was noted in the creek to the east of the Marsh in 2011 (Figure 4). The maximum number of territorial males ever observed in the Marsh was three.

Southwestern willow flycatcher (SWFL, *Empidonax traillii extimus*) is not known to breed in the Marsh, but migrating individuals may stop at the Marsh as part of their spring and fall migration. Although SWFL have been documented to breed in tamarisk scrub (Soggee, et. al 2005), breeding habitat consists of an overstory with a well-developed understory and surface water throughout the breeding season. The tamarisk scrub in the Marsh is not considered suitable breeding habitat for SWFL because it lacks the appropriate habitat structure and is considered too dry for the species to breed. Restoration of the Marsh will likely increase the amount of surface water adjacent to native riparian habitat. Ultimately, this restoration project should greatly improve the habitat suitability for this species.

D. MITIGATION SITE SUITABILITY

The proposed mitigation area is considered suitable for wetland habitat restoration, as it is an existing wetland that has been seriously degraded by exotic species invasion. It is also the largest, if not the only, perennial wetland in the region of the western Colorado Desert where the proposed OWEF is located. Wetland restoration would be accomplished by removal of invasive tamarisk trees. Wetland restoration is expected to succeed because tamarisk is the only significant biological disturbance to the Marsh, and removing and subsequent suppression of it has resulted in the recovery of native vegetation elsewhere in the State Park (Jorgensen 1996; Jim Dice, pers. comm.). Absent the alternating disturbance factors described previously, the Marsh already possesses appropriate topographical, hydrological, and biological potential to function as an intact natural wetland.



Plan Subject to Review and Approval by State Parks and Cal Fire

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Preliminary Tamarisk Removal Plan

OCOTILLO WIND ENERGY FACILITY

HELIX Environmental Planning

Figure 4

III. MITIGATION DESIGN CONCEPT

A. MITIGATION DESIGN

All mitigation will be located within project limits defined by the current extent of Carrizo Marsh, which is mostly within San Diego County and partially within Imperial County (Figures 4 and 5). Restoration will consist of initial invasive species removal by means of prescribed fire[2] and non-burn removal techniques (Table 4), followed by hand application of herbicide to tamarisk and other non-native resprouts in the burned and non-burn treatment areas. Prescribed fire is effective for removing large, pure stands of tamarisk such as those covering most of the Marsh (Harms & Hiebert 2006), but results in low mortality unless followed by herbicide application to resprouts (Lovich et al. 1994). Cut stump methods result in high tamarisk mortality if herbicide is applied immediately after cutting the stem of the plant (Lovich et al. 1994). The design details include measures to protect existing patches of native mesquite bosque, as well as to avoid potential disturbance to nesting LBV, SWFL, or other nesting bird species, should any be present.

Table 4
CARRIZO MARSH WETLAND RESTORATION PROJECT
TAMARISK REMOVAL METHODS

Treatment	Approximate Area (acres)
Prescribed Burn	171
Non-burn	128
Preserved Native Habitat	19
Total	**318**

1. Design Details

Preserved Areas

Portions of the Marsh (approximately 19 acres) that support mostly native species will be preserved (Figures 4 and 5). These preserved areas will be protected from prescribed fires by fuel breaks. Patches of native vegetation approximately 0.25 acres, or greater, in size will be excluded from prescribed fire. Fuel breaks 100 feet wide will be created outside the perimeter of each such patch. Tamarisk inside preserved areas will be cut and removed by hand, and the stumps immediately treated with herbicide. Removed tamarisk will be deposited in areas slated for burning. Patches of native vegetation smaller than 0.25 acres will not be preserved.

[2] The prescribed burn will be planned and implemented by State Parks and Cal Fire. The plan represented on these figures is preliminary.

Prescribed Burn Areas

Areas inside fuel breaks dominated by tamarisk will be burned with prescribed fire conducted by Cal Fire, in coordination with State Parks (Figures 4 and 5). This will remove all above-ground vegetation, as well as any vegetation from the fuel breaks and hand-removed tamarisk from the Marsh. Foliar herbicide will be applied to all tamarisk re-sprouts in the burned areas one to two months after burning. Burning will take place in October, in accordance with a plan developed by Cal Fire and State Parks. The preliminary plan anticipates initial tamarisk removal by prescribed burn to occur over approximately 171 acres.

Non-burn Treatment Areas

Non-burn treatment areas in this plan are stands of tamarisk that exist within or adjacent to the Marsh that should be removed but are too small to burn, are part of a fuel break area, or are in Imperial County (Figures 4 and 5). The removal of tamarisk from these areas may be by mowing or mulching with a suitably equipped track-loader, cut and treated with herbicide, or foliar herbicide application. The only stipulation for removal in these areas is that whichever treatment is used, the effects to the surrounding habitat will be minimized. Fuel breaks will be created prior to the prescribed burn and where deemed necessary by Cal Fire and State Parks. This is expected to be around the outside perimeter of areas slated for preservation and around the entire perimeter of the Marsh to prevent the spreading of fire into the surrounding desert. Debris from all clearing prior to the burn will be placed in areas slated for burning. Pre-fire clearing is planned to occur from July through October of 2012 and/or prior to March 15, 2012 (the start of the least Bell's vireo breeding season), if project permits are obtained prior to that date. Tamarisk debris cleared in preparation for the prescribed burn will also be burned to further reduce unwanted plant biomass. Areas cleared of tamarisk prior to the burn should be treated every other month with herbicide following the initial clearing to aid in tamarisk control. The preliminary plan anticipates initial tamarisk removal by using non-burn methods to occur over approximately 128 acres.

2. <u>LBV Avoidance and Minimization Measures</u>

In an effort to minimize and avoid impacts to LBV, the following avoidance and minimization measures are proposed for the approximately 318-acre Carrizo Marsh Restoration Project:

1. Ocotillo Express LLC will hire a qualified biologist to conduct focused surveys according to the Service's protocol for LBV in the 318-acre Carrizo Marsh project site. Focused surveys will include 8 site visits approximately 10 days apart between April 10 and July 31 of the year in which initial restoration is to occur. A survey report with a map and summary of the results will be provided to the BLM, Service, Corps, CDFG, and State Parks.
2. Firebreaks will be created to preserve native species within and adjacent to the marsh. Creation of firebreaks is planned to occur from July through October using various methods (e.g., a combination of mulching, mowing, cutting trees using chainsaws). Creation of firebreaks may occur prior to March 15 if project permits are obtained prior to that date. Tamarisk would be piled at the edge of the burn areas and allowed to dry out

Preserve Areas

P Native Vegetation[1]

Initial Removal Methods

B Prescribed Burn[2]

N Non-burn Eradication

State Park Least Bell's Vireo Sightings

★ Territorial Male 2010

☆ Territorial Male 2011

[1] Isolated tamarisk removal necessary in some areas
[2] Prescribed Burn will be done by Cal Fire

325 162.5 0 325 Feet

Job No: PEG-01 Date: 12/01/11

Plan Subject to Review and Approval by State Parks and Cal Fire

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Preliminary Tamarisk Removal Plan

OCOTILLO WIND ENERGY FACILITY

Figure 5

HELIX Environmental Planning

prior to the prescribed burn. Firebreak creation activities would take place at least 300 feet from the center point of the LBV use area documented during the focused surveys (Measure Vireo-1).

3. Creation of firebreaks shall be supervised by a Service-approved biologist to ensure these activities do not affect LBV. The biologist will have the authority to direct maintenance crews to stop work if LBV are detected within 300 feet of work activities. A 300-foot setback from the center point of LBV use area would be created and maintained until the end of the breeding season (September 15) or until LBV nestlings have fledged and are no longer dependent on the nest site, as determined by the monitoring biologist.
4. Islands of preserved habitat approximately 6.5 acres in size will be established and centered on the center point of each territorial LBV documented during the focused surveys (Vireo-1). A 6.5-acre island is considered adequate based on the typical LBV territory size, which ranges from 0.5 to 7.5 ac, as noted in the 1998 draft recovery plan for the species; this dimension also represents an approximately 300-foot radius around the center point of the estimated territory location. The islands will include as much native habitat (mesquite and arrowweed) as possible. The boundary of the 6.5-acre area will be clearly marked with highly visible flagging.
5. Tamarisk within the island created around an occupied territory would be removed outside the LBV breeding season (March 15 through September 15) or once all LBVs (adults and young of the year) have left the area as determined by the monitoring biologist.
6. If firebreaks are created during the LBV breeding season, the portions nearest to vireo territories will be the last to be created, thereby minimizing exposure of LBV to mechanized noise during the core of breeding season.
7. All work related to the project will be performed during daylight hours. No nighttime operations (including lighting) will occur.
8. Because of LBV's known site fidelity, patches of native habitat will be preserved within the marsh to encourage LBV to return to the marsh during the 5-year restoration effort. Two large patches (approximately 3.5 acres and 2.5 acres) and many smaller patches (approximately 1 acre) will be preserved.
9. In years subsequent to the initial burn, tamarisk removal associated with post-burn maintenance and spot treatment of resprouted individuals will be conducted outside of LBV breeding season as much as possible. When tamarisk removal must occur during the breeding season, avoidance measures described above will be implemented to avoid impacts to the LBV.
10. During the 5-year maintenance and monitoring period subsequent to the initial burn, the applicant will hire a qualified biologist to conduct focused LBV surveys in the 318-acre Carrizo Marsh project area. The survey approach would include 3 site visits each year approximately 10-14 days apart during the peak vireo breeding season (May 1 through June 15) to document the number and locations of breeding territories in the marsh. A survey report with a map and summary of the results will be provided to the BLM, Service, CDFG, and State Parks following each year's surveys.
11. A final Carrizo Marsh Restoration Plan will be submitted to the BLM, Service, Corps, CDFG, and State Parks for review and approval at least 30 days prior to groundbreaking. The plan will include finalized project description details described in this biological opinion and the draft Off-site Habitat Restoration Plan (Helix 2011b), and will not

include any substantial changes that would lead to different effects on least Bell's vireo than those analyzed in this biological opinion.

12. Ocotillo Express LLC agrees to restore the entire 318-acre Carrizo Marsh through the initial removal of tamarisk and 5-years of maintenance, monitoring and reporting with the understanding that the restoration would satisfy the mitigation requirements for PBS, Corps and CDFG jurisdictional habitats, and sensitive vegetation communities associated with the Ocotillo Wind Energy Facility project. Ocotillo Express LLC agrees to fund up to a $500,000 non-wasting endowment to ensure perpetual management of the 318-acre Carrizo Marsh. Such an endowment would be in place prior to the start of any work in waters of the U.S., as determined by the Corps. Ocotillo Express LLC reserves the right to work with another party who may need jurisdictional mitigation for the Corps and CDFG as a funding partner to establish the funding of the non-wasting endowment. Ocotillo Express LLC would identify this partner immediately and provide the additional information to the resource agencies immediately for their consideration.

B. TARGET FUNCTIONS AND SERVICES

The goal of the proposed mitigation plan is to restore the functions and value of Carrizo Marsh through the removal of invasive tamarisk and other non-native plant species. This will restore natural hydraulic and hydrologic functions and allow native species to recolonize the Marsh. Currently, tamarisk stands form a dense cover that impedes flood flows. When flood flows are impeded, they slow down and drop their sediment. Less impeded flows would not drop sediment and would increase sediment transport through the marsh. The nearby and remnant native habitats (i.e., mesquite bosque, arrow weed thicket, iodine bush scrub, black-stem rabbitbush scrub, alkali goldenbush scrub, and American bulrush marsh) are expected to colonize the Marsh following tamarisk removal. An expansion of native wetland habitats, an increased amount of surface water, higher groundwater and a return to more natural sediment transport through the Marsh are expected following removal of the tamarisk and reestablishment of native habitats. The basis for these expectations is that the phreatophytic tamarisk uses more water than the mosaic of native habitats are expected to use, and the tamarisk thickets trap more sediments than a system vegetated by native species. Ultimately, the recovered Marsh should once again provide habitat for PBS and other wildlife.

C. RATIONALE FOR EXPECTING IMPLEMENTATION SUCCESS

Because the Marsh is overwhelmingly dominated by tamarisk, it is currently not functioning as a complex ecosystem. Prior to the flood event of 1976, the Marsh was a healthy functional wetland supporting marsh and riparian habitat and mesquite bosque habitat. Its current degraded condition can be traced primarily to that single disturbance event. Tamarisk is currently the only seriously problematic invasive species in the Marsh. Thus, extirpation of tamarisk should allow the recovery of pre-disturbance conditions in the Marsh. Prescribed fire is an effective tool for removal of tamarisk, as the Marsh is an isolated island of wetland surrounded by desert badlands where there is little chance of fire spreading beyond the confines of the prescribed burn areas, especially with creation of fuel breaks on the perimeter of the Marsh.

Tamarisk is only sparsely distributed upstream of the Marsh and is being actively targeted for removal by State Parks, as part of a watershed wide control program, so there should be limited input of tamarisk propagules into the mitigation site. Long-term management of the Marsh to keep tamarisk from recolonizing it will maintain natural hydrology and vegetation, even if another major flood event occurred. The plan preserves patches of native vegetation to serve as seed banks for the recovery of native communities once the invasive tamarisk is removed (shown as native habitat on Figures 4 and 5). A study of a similar system in Afton Canyon, California, found that fire, followed by herbicide treatment was successful in removing tamarisk over a 590 acre area along the Mojave River(Egan 1999).. After only two years there were very positive changes observed there, including:

- Herbaceous cover increased 100 fold
- Native snags, formerly useless to avian perching birds began to support high bird numbers;
- Cavity nesting birds were virtually absent were observed foraging and taking up residence;
- Surface water levels in dense tamarisk removal areas increased dramatically (up to 1 foot); and
- Plant species diversity increased 3 fold.

With diligent suppression of tamarisk resprouts after the prescribed fire, the Marsh has a high probability of recovering to a functional system with native vegetation and natural hydrologic processes.

IV. PROJECT RESPONSIBILITY

This section outlines the parties responsible for funding, managing, implementing, maintaining, and reporting on the restoration specified in this HRP. In this and subsequent sections, we use the term “implementation” to refer to the tamarisk removal effort which includes creation of any necessary fuel breaks (including using cut stump herbicide application where necessary), selective removal of individual tamarisk, and prescribed fire methods described in Section III. Implementation is meant to encompass all phases of the mitigation project up to completion of initial tamarisk removal, at which time the project will enter the maintenance/monitoring phase.

A. PROJECT PROPONENT

Ocotillo Express LLC is the sole responsible party for funding the implementation, maintenance, monitoring, and the ultimate successful completion of this restoration project. They will be responsible for retaining all other parties necessary for successfully implementing this HRP. There is one notable exception to this and that is the actual burning of the Marsh. This task will be conducted by the Cal Fire and State Parks. Ocotillo Express LLC will be responsible for funding the prescribed burn.

B. RESTORATION SPECIALIST

Ocotillo Express LLC and State Parks will mutually agree on the selection of the restoration specialist who will be responsible for overall supervision of the implementation (except the controlled burn), maintenance, and monitoring of this restoration project; the restoration specialist will be the designated field contact representative and report directly to Ocotillo Express LLC and State Parks. The restoration specialist will oversee the pre-burn removal of tamarisk from the Marsh (i.e., mulching, cutting, and herbicide treatments) and all post-fire efforts of the maintenance contractor(s) for the life of the project. Specific tasks of the restoration specialist include educating all contractors and other project personnel of mitigation goals and requirements; directly overseeing creation of fuel breaks, tamarisk removal, maintenance, and coordinating annual assessments. At any time during project implementation, the restoration specialist will contact Ocotillo Express LLC and State Parks if issues that require attention, beyond those associated with normal weeding and maintenance, arise. The restoration specialist will perform site assessments and submit letter reports to Ocotillo Express LLC, State Parks, BLM, Corps and CDFG according to the schedule outline in Table 5.

C. IMPLEMENTATION/MAINTENANCE CONTRACTOR(S)

The implementation contractor will have experience in tamarisk and other weed species removal and control associated with habitat restoration. The implementation contractor will be responsible for creating any fuel breaks, and cut stump and foliar herbicide application. The restoration specialist will supervise the implementation/maintenance contractor(s) during all phases of the project, except the prescribed burn, from initial removal through the completion of the maintenance period.

After the initial removal of tamarisk is completed, Ocotillo Express LLC will hire a maintenance contractor for the duration of the 5-year minimum monitoring period. The maintenance contractor and the implementation contractor may be the same entity. Contract specification and contractor selection will be mutually agreed upon by Ocotillo Express LLC and State Parks. Ocotillo Express LLC and State Parks may agree to change contractors at their discretion. The maintenance contractor will have experience in maintaining native wetland habitat, knowledge of native and non-native plants, and be certified in herbicide application. The maintenance contractor will service the entire mitigation area according to the maintenance schedule (Section VII.B, below). Service will focus on, but not be limited to, tamarisk eradication and control. All activities conducted will be seasonally appropriate and approved by the restoration specialist. The maintenance contractor will meet the restoration specialist at the site when requested and will perform all remedial actions identified during restoration specialist's quarterly site assessments in a timely manner as directed.

D. STATE AGENCIES

All details regarding preparation, timing, and implementation for the prescribed burn will be done by State Parks and Cal Fire. These agencies will develop the specifications for where to create any and all fuel breaks and when and how to do the actual prescribed burning.

V. MITIGATION IMPLEMENTATION

A. IMPLEMENTATION SCHEDULE

The anticipated start date for project implementation is spring 2012. The mitigation should be implemented concurrently with impacts to WUS on the OWEF project site, but may not be initiated until immediately after the bird breeding season due to restrictions on tamarisk removal in the Marsh during the bird breeding season. The eventual timing of the implementation will vary as needed to coincide with seasonal conditions at Carrizo Marsh and is also dependent on the timing of the project permits and project approvals. Monitoring of the mitigation effort will begin with the delineation of the restoration area and refinement of the Preliminary Tamarisk Removal Plan (Figure 4). The establishment of fire breaks and manual removal will be done prior to March 15, 2012 or between July and October 2012, in accordance with the LBV Avoidance and Minimization Measures outlines in Section III.A.2. The prescribed burn is expected to occur in fall 2012, but the actual timing will be determined in coordination with State Parks and Cal Fire. The maintenance of the restored habitats will begin following completion of implementation.

B. PRE-CONSTRUCTION MEETING

Prior to initiation of restoration activities, an on-site meeting will be held with Ocotillo Express LLC, State Parks, the restoration specialist, implementation contractor, and interested state and federal agency representatives. Topics that will be addressed at this meeting include but are not limited to: (1) timing constraints for mulching and burning activities; (2) identification of mulching areas and a strategy for accurate execution of mulching activities; (3) defining site access routes and restrictions; (4) locating staging areas; and (5) review of overall project goal.

C. DELINEATING LIMITS OF WORK

To avoid unnecessary impacts to existing habitat areas to be treated will be clearly marked with highly visible flagging. All mechanized tamarisk removal will be done under the direct supervision of the restoration specialist. Furthermore, all contractor personnel must be able to accurately identify tamarisk, as well as native species targeted for avoidance, at the Marsh.

D. NON-NATIVE PLANT REMOVAL

Although the focus of Marsh restoration is tamarisk removal and control, other non-native plants shall be removed from the Marsh. Removal of non-native plant species other than tamarisk by means other than mechanical clearing, burning, or hand-removal, may be stipulated by the restoration specialist if necessary.

E. DOCUMENTING BASELINE CONDITIONS

Following completion of project implementation, the restoration specialist will assess and photograph the restoration area to document the baseline post-tamarisk removal condition of the Marsh. Results from this assessment will be used over the course of the 5-year monitoring effort to determine whether post-restoration functions and services improved as a result of the tamarisk removal effort. Additionally, vegetation monitors who would assist the restoration specialist in

collecting transect data would be hired upon mutual agreement of Ocotillo Express LLC and State Parks. These individuals will possess previous experience in vegetation monitoring using the methods described herein and in vegetation data analysis.

VI. FIVE-YEAR MAINTENANCE

A. MAINTENANCE ACTIVITIES

These maintenance guidelines are specifically tailored for non-native plant exclusion. A minimum 5-year maintenance program is proposed to ensure the successful elimination of tamarisk and other non-native species from the Marsh. The maintenance program will focus on weed control, but may also include trash removal, implementation of vehicle access restrictions, and any remedial measures deemed necessary for the success of the HRP. Maintenance activities will be directed by the restoration specialist.

1. General Maintenance

The maintenance contractor will be responsible for all maintenance activities during the minimum 5-year maintenance and monitoring period. It is the contractor's responsibility to keep all restored areas free of weeds and trash. The contractor will maintain the site in accordance with the requirements set forth in the final approved mitigation plan. The restoration specialist will supervise all maintenance activities to ensure the requirements of the final mitigation plan are met.

2. Non-native Plant Removal

Particular emphasis will be placed on pro-active removal of non-native plants, especially tamarisk. Non-native plants should be removed by hand and or controlled with the proper herbicides. Maintenance personnel must be able to identify tamarisk and should be knowledgeable in distinguishing between native and other non-native species. Additional guidance will be provided, as needed, by the restoration specialist.

3. Other Pests

Insects, vertebrate pests, and diseases will be monitored. Generally, there will be a high threshold of tolerance before control measures are considered. As required by law, specific recommendations will be made only by a licensed pest control adviser. All applicable federal and state laws and regulations will be closely followed. The restoration specialist will be consulted on any pest control matters.

B. MAINTENANCE SCHEDULE

Maintenance will be performed as necessary to prevent re-seeding and resprouting of non-native plants and may likely change with varying site conditions and seasons; the schedule outlined herein (Table 5) serves only as a guideline. At a minimum, the contractor will conduct weed

control every other month during the first year; quarterly for years 2 and 3; and twice per year in years 4 and 5 (in spring and fall to cover leafing out and seeding of tamarisk, respectively). The implementation/maintenance contractor(s) will complete maintenance requests from the restoration specialist within 14 days of any written request or monitoring report that identifies that remedial measures are needed.

Table 5
MAINTENANCE SCHEDULE FOR THE 5-YEAR RESTORATION PERIOD*

YEAR	FREQUENCY
Implementation Contractor	
Following fuel break creation and prior to burn.	Monthly
Maintenance Contractor	
Year 1	Every other month
Years 2 and 3	Quarterly
Years 4 and 5	Twice yearly

*This schedule is only a guideline; maintenance will be performed as necessary and as directed by the restoration specialist.

VII. MONITORING

Monitoring consists of documenting biological and physical habitat changes at the Marsh and documenting specific activities. The activities to be monitored include implementation and maintenance. Monitoring will be conducted by qualified biologists.

A. HABITAT CHANGES

The documentation of the changes at the Marsh will begin prior to implementation and continue for at least five years following the completion of the prescribed burn. Each habitat monitoring event will consist of photo documentation, general wildlife survey, vegetation transect data collection and analysis, and performance of the CRAM. The results of each habitat monitoring event will be summarized in an annual report, which will be submitted to Ocotillo Express LLC, State Parks, BLM, USFWS, Corps, and CDFG no later than December 31st. Each will include thorough presentation, analysis, and discussion of quantitative and qualitative data, animal and plant species lists, and photos from established permanent photo stations. Each will also reiterate performance standards and, if appropriate, provide a realistic assessment of site progress.

1. Photo Documentation

Permanent photo monitoring stations (PMS) will be established such that the overall condition of the Marsh can be documented prior to and following implementation of this plan (i.e., completion of prescribed burn). Permanent monitoring station locations will include vantage

points overlooking the Marsh and ground level locations, including the zero end of each vegetation transect (Section VII.A.2).

Photos will be taken following implementation as part of all 5 annual monitoring events and will be included in the respective year's annual report. Photos will be taken at the same photo locations using the same photo criteria (e.g., height, cardinal direction, etc.) that are established prior to the start of the restoration effort. To visually demonstrate the progress of the restoration effort, photos taken immediately after restoration implementation will be included in each report for comparison with the respective year's annual assessment photos. The photo locations will be permanently marked in the field, with the aid of a Global Positioning System, and on an aerial photograph in the baseline monitoring report and all subsequent annual reports.

2. <u>Vegetation Data</u>

Fifteen permanent 50-meter point-intercept vegetation sampling transects will be established using a stratified random method. Transects will be distributed proportionally based on area within the restoration project among three types of areas: prescribed burn, fuel break and manual removal areas, and preserved habitat (i.e., native habitat), such that sampling intensity is roughly equal across treatments. Data from these transects will consist of species richness and relative abundance of native and non-native plants in 3 height categories, at the species level. Analysis will include calculations of native- and non-native species richness, vegetative layer diversity and species composition, and native- and non-native cover. Permanent transects will be established and baseline data will be recorded from these transects prior to commencement of implementation activities. These methods provide the opportunity for comparisons of success between treatments, though success of the project will be evaluated in total.

Plant cover data will be collected along each transect using the point intercept line transect sampling methods described in the CNPS's Field Sampling Protocol (Sawyer and Keeler-Wolf 1995). Cover data will be collected by recording all of the plant species intercepted at each 0.5-m interval along the length of each transect. Vegetation will be recorded separately for herb (0 to 0.6 m), shrub (0.6 to 2 m), and tree (greater than 2 m) layers. Species richness (the number of native species present in a given area) data will be collected by noting all species occurring along a 5-m belt transect centered on each line transect.

Qualitative assessments of vegetation will also be made each year. These will include: estimated heights of native shrub and tree species and evidence of native species recruitment. Photos taken from the permanent photo stations may help in this assessment.

3. <u>General Wildlife</u>

During each of the five annual monitoring periods, all wildlife incidentally observed or otherwise detected will be documented and a list will be provided in the annual report. The location(s) of LBV and other listed wildlife species observed or detected during monitoring visits will be documented and included in the annual reports.

4. CRAM

Two CRAM analysis locations were conducted in the Marsh on June 18, 2010 as part of a larger, Carrizo Creek watershed analysis (Ecosphere 2010). Based on this assessment, the proposed mitigation site has a CRAM score of 61. As previously noted the Marsh is highly disturbed and supports extensive coverage of invasive non-native plant species, which resulted in low scores for the Physical Structure and all of the Biotic Structure attributes. The elimination of tamarisk from the Marsh is expected to result in an increase in CRAM scores for biotic structure, primarily from the removal of tamarisk and subsequent reestablishment of native species, and small improvements in the physical structure and possibly hydrology attributes (Collins, et. al. 2008). The buffer, and landscape context attributes are not expected to change. Please refer to Section IX for a discussion of the expected changes in the overall CRAM score and the expected changes in the CRAM metrics.

CRAM practitioners will conduct a CRAM assessment according to the User's Manual: *California Rapid Assessment Method for Wetlands: Riverine Module, v. 5.0.2* (September 2008) and other training materials located on the CRAM web site (www.cramwetlands.org) prior to completion of the prescribed burn and again in Years 3 and 5. As part of this assessment, a variety of landscape context, hydrology, and structure attributes and associated metrics will be assessed at 4 locations. The results will be presented as an average of the four samples. Four assessment locations are planned to ensure that a sufficient number of samples are done to obtain a representative average of the relatively large study area. The CRAM sampling sites will be placed to capture the variation in Marsh's physical and biological attributes (Figure 6). Results of these assessments will be used for later comparison with post-restoration CRAM scores to determine how functions and services were replaced by the mitigation effort.

B. ACTIVITY MONITORING

Implementation and maintenance activities will be monitored. Monitoring will consist of observations related to the activity. A summary of the success of the activity and recommendations for future activities will be provided in a memo to Ocotillo Express LLC and State Parks following completion of the activity or at regular intervals. The schedule for activity related monitoring varies from daily to twice annually (Table 6).

1. Implementation Monitoring

The restoration specialist will monitor the implementation, including site preparation, creation of a fuel break, burning and manual removal (Table 6). The resource agencies will be notified in writing that implementation is to begin at least 10 days before the anticipated start date.

Table 6 MONITORING SCHEDULE*	
PHASE	**SCHEDULE**
Implementation	
Mechanized, manual, chemical, and prescribed burn tamarisk removal	Daily
5-year Monitoring Period	
Year 1	Every other month
Years 2 and 3	Quarterly
Years 4 and 5	Twice annually

*This schedule is only a guideline; monitoring will be performed as necessary, as determined by the restoration specialist.

2. Maintenance Monitoring

Following implementation, the restoration specialist will monitor maintenance activities during the minimum 5-year restoration effort (Table 6), beginning immediately following completion of implementation. For Year 1 monitoring visits will be conducted every other month. In Years 2 and 3, monitoring will be quarterly. In Years 4 and 5, monitoring inspections will occur twice annually: in the spring and fall. Monitoring memos noting any issues will be provided as necessary to the implementation/maintenance contractor(s) and project proponent(s). This monitoring schedule is the minimum and may require a higher level of intensity if tamarisk is not controlled as expected.

3. Least Bell's Vireo Monitoring

Focused surveys for least Bell's vireo will be conducted as part of the 5-year maintenance and monitoring period. The survey approach would include 3 site visits each year approximately 10 to 14 days apart during the peak vireo breeding season (May 1 through June 15) to document the number and locations of breeding territories in the marsh. A survey report with a map and summary of the results will be provided to the BLM, Service, Corps, CDFG, and State Parks following each year's surveys

C. ANNUAL REPORTS

An annual report will be prepared by the restoration specialist each year during the 5-year monitoring period. Each report will provide the results of qualitative and quantitative vegetation monitoring to date, an assessment of how the project is progressing toward established goals, any recommended management changes, and recommended remedial action needed to ensure project goals are met.

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CRAM Sampling Locations

OCOTILLO WIND ENERGY FACILITY

HELIX Environmental Planning

Figure 6

Baseline post-restoration photos, as well as photos from the respective annual assessments, will be included in the annual reports, which will be submitted to Ocotillo Express LLC, State Parks, BLM, Corps, USFWS, CDFG, and Imperial County by December 31 of each year.

VIII. SUCCESS CRITERIA

The success of the mitigation plan will be the complete removal and near exclusion of tamarisk and other non-native species from the Marsh (Table 7). Cover of tamarisk and other weeds will be less at the end of first year than prior to the initial removal, however, resprouts and improved germination conditions for seeds already present at the Marsh will result in an abundance of weed cover in the short term. Control efforts will continue throughout the five year maintenance period and over time will drastically reduce the cover of tamarisk and other species.

Table 7
FIVE YEAR PERFORMANCE STANDARDS
CARRIZO MARSH WETLAND RESTORATION

HABITAT/PARAMETER	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Transect Data					
Tamarisk cover					
Shrub and tree layers	0%	0%	0%	0%	0%
Herb layer	20%	15%	10%	5%	<5%
Cal-IPC Noxious Weed Cover[1]	10%	10%	7%	5%	<5%
Cover by Other Weed Species	50%	40%	30%	25%	<20%

[1] Species classified by Cal-IPC as high and moderate invasiveness, exclusive of *Tamarix* spp.

A. TAMARISK COVER

The goal of the mitigation project is to restore the wetland functions and values of the Marsh by passively restoring native vegetation to the Marsh through removal of tamarisk. To ensure recovery of native habitat, tamarisk should be absent from the tree and shrub layers until the native habitat has matured. At the end of 5-year maintenance and monitoring period, tamarisk cover must be 0 percent in the shrub and tree layers, and less than 5 percent in the herb layer for the project to be deemed successful.

B. NOXIOUS WEED COVER

Cover by noxious weed species categorized as High or Moderate degree of invasiveness by the California Invasive Plant Council (Cal IPC) must be less than 5 percent, with the exception of non-native grass species. Non-native grass species will be controlled, but there will be a greater tolerance for those species.

C. WEED COVER BY OTHER WEED SPECIES

Cover by other (non-invasive) weed species must average less than 20 percent across all layers and transects in the fifth year of monitoring.

IX. ANTICIPATED FUNCTIONS AND SERVICES IMPROVEMENTS

The removal of tamarisk is expected to improve the functions and services of the Marsh beyond simply the removal of this noxious weed. A description of the anticipated improvements in the functions and services are described in the sections below.

A. CRAM

CRAM metrics should increase in a number of areas including Hydrology, Physical Structure, and Biotic Structure. The overall CRAM score should increase each year (Table 8). The overall CRAM score for the Marsh was recently documented at 61 (Ecosphere 2010). The CRAM score for the Marsh is expected to increase to 77 over 5 years. This increase is expected due to improvements in hydroperiod, hydrologic connectivity, structural patch richness, topographic complexity, number of plant layers, co-dominant species, horizontal interspersion and zonation, vertical biotic structure, and a decrease in invasive species.

Table 8
CRAM METRIC SUMMARY

METRICS	BASELINE SCORES[1]	TARGET SCORES[1]	
	Pre-Restoration[2]	Year 3	Year 5
Buffer and Landscape Context	22.3/93	22/93	22/93
Hydrology	24.1/67	27/75	30/83
Physical Structure	10.6/44	12/50	15/63
Biotic Structure	14 /39	19/53	25/69
Overall Score	**61**	**68**	**77**

[1]Score (Raw/Final)
[2]Conducted prior to any tamarisk removal

B. SURFACE AND GROUNDWATER

The removal of over 300 acres of phreatophytic vegetation is expected to have an immediate and drastic effect on the hydrology of the Marsh. Initially, it is expected that surface water and ground water in the Marsh will increase substantially and should be most evident during the wettest time of the year, which is typically March. As native species become established and tap into the groundwater these levels should decrease, but are always expected to be deeper (surface water) or higher (groundwater) than the current condition.

To document changes in surface water at the Marsh several staff gauges will be installed in the pond at the Marsh. To document changes in groundwater at the Marsh a series 5 of piezometers will be installed perpendicular to the flow line, in the middle of the Marsh. These parameters will be monitored quarterly for the duration of the monitoring and reporting program.

X. COMPLETION OF MITIGATION

A. NOTIFICATION OF COMPLETION

Ocotillo Express LLC, State Parks, the BLM, the Corps, CDFG, and USFWS will be notified of completion of the restoration/mitigation effort through the submittal of the final (Year 5) monitoring report.

B. CONFIRMATION

If the project meets all success standards at the end of the 5-year monitoring period or sooner, then the mitigation will be considered a success; if not, the maintenance and monitoring program will be extended one year at a time until the standards are met. Specific remedial measures (approved by the resource agencies) will be used during any such extension. This process will continue until all Year 5 standards are attained or until the resource agencies determine that other mitigation measures are appropriate. Should the mitigation effort meet all goals prior to the end of the 5-year monitoring period, the resource agencies, at their discretion, may terminate the monitoring effort. If requested, a site visit may be conducted with the resource agencies to verify site conditions.

C. LONG-TERM MANAGEMENT

Following completion of restoration, it is proposed that State Parks will manage and maintain the Marsh via the establishment of a non-wasting endowment. Ocotillo Express LLC has agreed to fund up to a $500,000 non-wasting endowment to ensure perpetual management of the Marsh. The $500,000 endowment is based on the information gathered as part of the preparation of this Plan (see Appendix A for a summary of the endowment estimate).

D. SITE PROTECTION

The approximately 318-acre Marsh occurs on lands owned by the State of California and managed by State Parks. It is proposed that State Parks will manage and maintain the Marsh following agency acceptance of the restoration/mitigation effort. As such, a conservation easement would not be required for the Marsh.

XI. CONTINGENCY MEASURES

A. IMPLEMENTATION

Implementation of this mitigation plan will begin with project approval and permits. In the event that Ocotillo Express LLC is wholly or partly prevented from performing obligations under the final plans (causing temporal losses due to delays) because of unforeseeable circumstances or causes beyond reasonable control, and without the fault of negligence of the project applicant, including but not limited to labor disputes, sudden actions of the elements, or actions by federal or state agencies, or other governments, Ocotillo Express LLC will confer with BLM, Corps, CDFG, USFWS, and State Parks on a mutually agreeable course of action suitable to the remaining extent of Ocotillo Express LLC's obligation and the effect of such unforeseeable cause(s) on the success of the restoration project.

B. INITIATING PROCEDURES

If any of the agencies determine upon receipt of any of the annual monitoring reports that the mitigation effort is not making sufficient progress on meeting success standards for the project, the agencies shall notify Ocotillo Express LLC in writing that the restoration effort may require augmentation for successful implementation. Ocotillo Express LLC will then have 30 days to respond to the correspondence, confirming that contingency measures will be required. Ocotillo Express LLC will be responsible for all costs associated with restoration, monitoring, and any remedial measures.

C. NATURAL DISASTER

Should a natural disaster occur during the restoration period such as an earthquake or flood, Ocotillo Express LLC will confer with BLM, Corps, CDFG, USFWS, and State Parks on a mutually agreeable course of action, which would be based on the goals and objectives outlined in this plan.

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Appendix A

CARRIZO MARSH ENDOWMENT ESTIMATE

Appendix A
CARRIZO MARSH ENDOWMENT ESTIMATE

TASK	COST
Estimated Annual Maintenance Cost	$10,000*
Reporting/Administration	4,000
Subtotal (Annual Costs)	14,000
Contingency (20% of annual cost)	2,800
TOTAL (Estimated Annual Management/Reporting Funds)	**$16,800**
Capitalization Rate (National Wildlife Foundation)	3.5%
Estimated Endowment Amount (to provide annual management funds of $16,800)	**$480,000**

* Cost estimate to provide annual management of the 318-acre Marsh upon acceptance of final success criteria; State Parks provided a cost estimate of $8,000 to $10,000 per year to manage the Marsh.